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(74) <b>Agent:</b> Weber, O., Cert. Phys.; Heim, H., Cert. Eng., Cert. Industrial Eng., Patent Attorneys, 81479 Munich	(56) <b>Documents taken into account for evaluating the patentability:</b>  DE 41 10 299 C1 DE 41 22 221 A1 DE 35 18 531 A1 DE 34 13 504 A1 DE 93 03 383 U1

#### (54) Metering Device

(57) A metering device for nutrient supplements, e.g., with vitamins and minerals, is described, which makes possible an individual, easy-to-handle supply of a user, taking into account special living conditions or therapeutic measures. A plurality of storage containers for separately accommodating the individual nutrient supplements are detachably arranged on a common carrier. The individual storage containers are emptied in a specific manner into a collection container by means of clearly assigned dispensing devices, controlled by an electronic evaluating unit wherein an individual nutrient supplement mixture is produced. The user-related control parameters are read into the metering device via an electronic memory card and/or via line connections with an external data source in the particular case. The assignment of individual dispensing devices to storage containers or their contents can be performed preferably by means of a bar code reader.

## Specification

5 The present invention pertains to a metering device for nutrient supplements, especially vitamins and minerals, in ready-to-use doses.

10 Nutrient supplements, especially vitamins and minerals, have been known to be added to various foods and beverages to compensate for deficiencies. Furthermore, they are available as preparations in various forms of presentation in pharmacies, drug stores, grocery stores, etc. However, the consumer has, in general, no differentiated knowledge of his own deficiencies and is therefore unable to compensate them in a specific manner. The possibility of a harmful effect of the uninformed consumption of these nutrient supplements on health would have to be examined in the particular case. However, it has been known, on the one hand, that the commercially available preparations cannot compensate all deficiencies, and that, on the other hand, a number of vitamins and minerals are thus consumed unnecessarily, so that a qualitative improvement is not necessarily achieved despite the costs incurred. In the case of the commercially available presentations, the nutrient supplements are metered by preparing coated tablets, capsules or tablets, which are packaged in dispensers and contain predetermined doses, or, in the case of an addition to foods or beverages, by the consumer having to make an estimation or calculation based on the amount of food or beverage. These possibilities of metering are therefore inaccurate or cumbersome and lead to the above-described undersupply or to expensive and ineffective oversupply.

25 A device for packaging cosmetic preparations, which has a plurality of storage containers, whose discharge openings are detachably connected to a controllable dispensing device each, which have the same design, has been known from DE 41 10 299 C1, on which the preamble of claim 1 is based. Furthermore, an electronic control is present in this prior-art device for the individual dispensing devices. An electronic evaluating unit is connected here at least on the input side to an interface for receiving a memory card.

30 A device for storing drugs, which has an optical code reader, has been known from DE 35 18 531 A1.

35 A drug metering device, in which the individual compartments have a closing and opening mechanism, has been known from DE 93 03 383 U1.

40 The basic object of the present invention is to provide a metering device of the type described in the introduction, which makes it possible to compensate deficiencies of nutrient supplements in a specific manner and can be handled simply and reliably.

45 This object is accomplished according to the characterizing part of claim 1. Preferred variants are described in the subclaims.

50 The present invention offers the advantage of enabling the user to specifically adjust his daily vitamin and mineral intake to the daily intake of these nutrients through food, to the deficiencies that develop in the process, as well as to the additional need possibly caused by his living conditions. It enables him to evaluate his nutrition habits corresponding to his nutrient goals and to change them correspondingly. Due to the very highly differentiated and individualized metering, it also makes possible a therapeutic use by health care professionals. Furthermore, it has the advantage that the laborious removal of tablets or capsules, e.g., from so-called blisters, is eliminated, and a highly efficient and individualized, ready-to-use composition is available, instead. The use of reusable storage containers can also contribute to a reduction of wastes.

60 The use of the electronic memory card offers the advantage that information on daily nutrient deficiencies, which can be determined very accurately, taking into account the age, body weight, height and sex of the consumer, can be checked practically at any time and deficiencies can thus be compensated. Individual deviations from known standard values, such as those used, e.g., by the Deutsche Gesellschaft für Ernährung [German Society of Nutrition - Tr.Ed.] as the basis for the calculation of nutrient deficiencies and the corresponding

metering of the nutrient supplements, can be recorded for predetermined periods of time and taken into account by a physician or another qualified consultant, e.g., a nutritionist. Furthermore, a therapeutic nutrient supply can be prescribed by means of the memory card and a supply in which the biochemical individuality of the user, i.e., metabolic peculiarities in resorption, can be ensured.

Last but not least, the control of the metering device by means of the memory card ensures that nutrient supplements are not supplied when the personal circumstances of the user do not require supplementation. Therefore, he no longer needs to ingest nutrient supplements as a precaution and needlessly, so that he can save the costs and efforts involved and possibly avoid the consequences of an unintended overdosage.

The present invention will be described in greater detail below on the basis of an exemplary embodiment shown in the drawing. The only figure schematically shows a perspective view of a metering device for nutrient supplements.

A plurality of storage containers 9 for separately accommodating different nutrient supplements are arranged on a frame 4 in a housing 2 such that their contents can be removed by individually controllable dispensing devices 20.

In the example shown, the storage containers 9 are designed as glass or plastic bottles, which are held with their openings facing downward in receiving cups 21 of the dispensing device 20. All the dispensing devices 20 lead to a funnel 6, which is arranged under them and is provided with a liquid-repellent coating, so that liquids removed from the storage containers 9 cannot adhere. A closure 7, which can be operated by hand and can be actuated, e.g., by a rotary movement or by depressing a button to empty the funnel 6 into a vessel held under it, is arranged at the opening of the funnel. The funnel 6 may be removed for cleaning.

The individual dispensing devices 20 are controlled by an electronic evaluating unit (not shown). In the example shown, they are also combined with a filling level sensor, which is connected on its output side to the evaluating unit. Furthermore, the filling level sensor 3 is designed as a cannula here, which is also used to puncture a closure of the storage containers 9 when they are inserted into the dispensing device 20 and thus to open the storage container 9 in question to make it ready for removal. As an alternative, perforating means may also be present at the receiving cups 21.

The storage containers 9 contain a carrier liquid, in which the vitamins and minerals in question are dissolved such that a very small dosage unit of every nutrient supplement is contained in an equal volume of liquid. Therefore, if a drop is assumed to be the smallest dosage unit that can be removed, the dosage is consequently selected to be such that the smallest amount to be metered is dissolved in one drop, taking into account all the nutrient supplements used here. Nutrient supplements that are required at higher doses are removed by removing a correspondingly larger number of drops. Therefore, all dispensing devices 20 may therefore be of the same design. Even though a liquid is selected as the carrier substance for the example, it is basically also possible to use a granular substance or another similar substance as the carrier. The dispensing devices 20 would be designed correspondingly as granule metering devices rather than as controllable pipettes in this case.

The metering device also has a bar code reader 19, which is used to read information on labels on the storage containers 9 and to pass on the information to the evaluating unit. Such information is provided by the manufacturers of the nutrient supplements packaged usually in the form of bar codes.

Before a storage container 9 is inserted into a dispensing device 20, the bar code printed thereon is moved past the bar code reader 19. All relevant data of the nutrient supplement are recorded by the evaluating unit. In addition, the evaluating unit specifies a single one of the dispensing devices 20 present for receiving the storage container 9 in question and blocks all the unoccupied dispensing devices that may be present, so that a clear assignment of the storage container 9 and dispensing device 20 is guaranteed. The re

lease/blocking may be performed either by an optical display or mechanically by locking.

5 An interface 10 for an electronic memory card is also present in the housing 2. Individual data of the user, such as age, sex, body weight, are entered with this into the evaluating unit for further processing. In addition, the memory card contains information on a therapeutically indicated need for nutrient supplements or on a need for nutrient supplements that is determined by the specific lifestyle. Conversely, information on the use of the metering device and/or the consumption of nutrient supplements can be stored on the memory card via the interface 10, so that this information can be monitored and evaluated by a physician or a nutritionist. In addition to the data recorded on and read from the memory card, other nutrition-specific parameters, e.g., concerning the daily food intake in conjunction with a diet and an electronic scale supporting the diet, may be recorded and read for evaluation via additional serial or parallel interfaces via data lines.

15 The manual data exchange is performed by the user by means of a keypad 12. The keypad 12 may also be used instead of the bar code reader 519 to specify storage containers with respect to their contents and their assignment to a certain dispensing device 20.

20 An optical display 14, e.g., an LCD display, displays status reports of the metering device and user instructions, e.g., when the metering device has no storage container for a nutrient supplement indicated on the memory card and a substitution or addition is necessary.

25 The metering device is switched on and off, the upper part 5 of the housing is opened to provide access to the storage containers 9 and the lower part 8 of the housing is opened to remove the funnel 6 for cleaning purposes by means of the control elements 11, 16, 17, and 18. The figure illustrates a half-opened state. Additional control elements 16, 17 are used to operate the interfaces 10, the bar code reader 19 as well as the display 14.

30 A typical use of the above-described metering device is carried out as follows. The nutrient supplements are purchased in uniform storage containers 9 according to the individual needs, taking into account empirical values and/or therapeutic aspects. Every individual storage container 9 is moved past the bar code reader 19 before they are inserted into the frame 4, and the corresponding dispensing device 20 is assigned and released via the evaluating unit. The metering device is ready to use after this first introduction of the storage containers, and only empty storage containers need to be replaced.

35 To remove nutrient supplements, the memory card is introduced into the interface 10. By depressing a button, a metering program can then be run. To do so, the data contained on the memory card are first taken over into the evaluating unit, where the dosage is calculated. Depending on the result, the evaluating unit controls the corresponding dispensing devices 20, so that the individual nutrient supplements are released into the funnel 6 in a specifically metered manner. If the filling level sensor 3 indicates that at least one of the necessary storage containers 9 is empty or that no storage container 9 is present, removal from the other storage containers 9 is also prevented, and a corresponding display is shown, so that it is ensured that an incorrectly metered amount will not be dispensed. The same is true if the evaluating unit determines based on the information entered via the interface 10 that the nutrient supplements contained in the storage containers 9 do not correspond to the nutrient supplements necessary for supplying the user. This is also displayed correspondingly on the metering device, under the control of the evaluating unit. The user now has the possibility of replacing the storage containers, and the changed assignment of the dispensing devices 20 is again performed by the use of the bar code reader 19 or the keypad 12.

#### Patent Claims

1. Metering device for nutrient supplements, especially vitamins and minerals, in ready-to-use doses, wherein a plurality of said storage containers (9) for receiving one nutrient supplement with a corresponding carrier substance is arranged on a said common frame (4);

the discharge openings of the said storage containers (9) are detachably connected to a said, individually controllable dispensing device (20); all said dispensing devices (20) have the same design; an electronic control is present for the said individual dispensing devices (20), which is connected on the input side to an electronic evaluating unit; and the electronic evaluating unit is connected at least on the input side to a said interface (10) for receiving a memory card, via which personal control data can be read for the said dispensing devices (20), characterized in that an optical code reader is present, which is connected on the output side to the evaluating unit; that each said dispensing device (20) is provided with a locking means connected to the evaluating unit; and that the evaluating unit releases only one of the said dispensing devices (20) by means of the locking means depending on the code read, and it blocks all unoccupied dispensing devices (20) present; in order to make possible or prevent the insertion of a said storage container (9).

2. Metering device in accordance with claim 1, characterized in that the said dispensing devices (20) are connected on the outlet side to a collection container.

3. Metering device in accordance with claim 2, characterized in that the collection container is designed as a said funnel (6), which is provided with a liquid-repellent coating.

4. Metering device in accordance with one of the above claims, characterized in that the said dispensing device (20) has a said filling level sensor (3) each, which is monitored by the evaluating unit.

5. Metering device in accordance with one of the above claims, characterized in that the dispensing device has a blade or tip, which produces a perforation of a container closure to empty the said storage container (9) on insertion of a said storage container (9).

6. Metering device in accordance with one of the above claims, characterized in that a said keypad (12) for manual data entry is present.

7. Metering device in accordance with one of the above claims, characterized in that a serial and/or parallel interface is present for line connection to an external data source.

8. Metering device in accordance with one of the above claims, characterized in that a said display field (17) controlled by the evaluating unit is present for displaying information.

9. Metering device in accordance with one of the above claims, characterized in that commercially available glass or plastic containers are used as the storage containers.

10. Metering device in accordance with one of the above claims, characterized in that it is a device intended for mounting on a wall.

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Attached: 1 page(s) of drawings

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DRAWINGS PAGE 1

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[Figure]

